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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/701,260	11/04/2003	Scott D. Brandenburg	DP-310095	6076
22851	7590	07/21/2005	EXAMINER	
DELPHI TECHNOLOGIES, INC.			NGUYEN, THINH T	
M/C 480-410-202			ART UNIT	
PO BOX 5052			PAPER NUMBER	
TROY, MI 48007			2818	

DATE MAILED: 07/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/701,260

Applicant(s)

BRANDENBURG ET AL.

Examiner

Thinh T. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8, 10-12 and 18 is/are pending in the application.
- 4a) Of the above claim(s) 18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-8 and 10-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. This is in response to Applicant's Amendment filed 27 June 2005.

Note that the figures and reference numbers referred to in this Office Action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

2. Claims 1-8,10-12, including new claim 18 are pending in the application.

3. Newly submitted claim 18 is directed to inventions that is independent or distinct from the invention originally claimed for the following reasons:

**I/ Species I:** Claims 1-8,10-12 directed toward a power package **without the additional Semiconductor chip.**

**II/ Species II:** Claims 18 directed toward a method of making a semiconductor device **with the additional semiconductor chip.**

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 18 is withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1. 142(b) and MPEP 821.03.

4. Applicant's amendments to independent claim 1 have necessitated new grounds of rejection for claims 1-8,10-12. See MPEP § 706.07(a).

**Claim Rejections - 35 USC § 102**

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

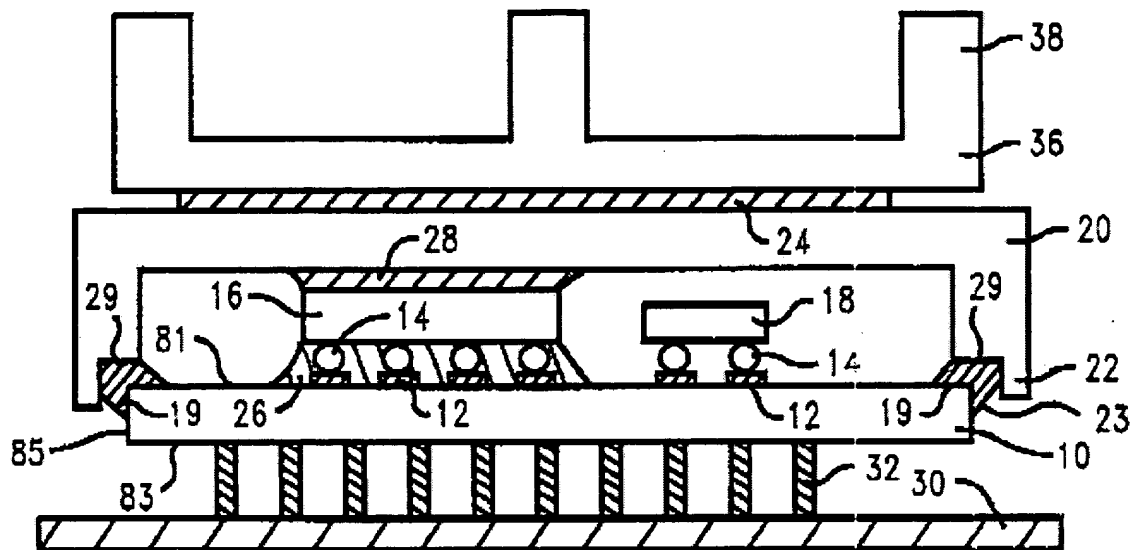
6. Claims 1,2,10,11 are rejected under 35 U.S.C. 102(b) as being anticipated by Toy et al. (US patent 5,956,576) or Distefano (US patent 6,075,289).

**REGARDING CLAIM 1**

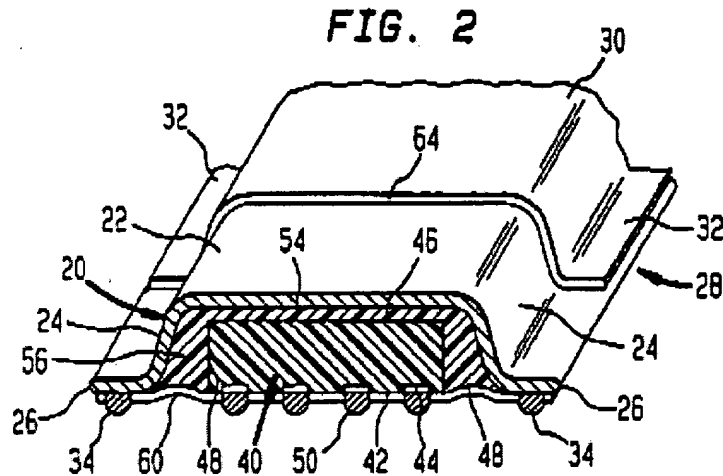
Toy ( Fig 1,column 4 lines 13-15) discloses a heat sinkable package, comprising: a power device package including at least one semiconductor chip ( fig 1 reference 16) having an active side and a non-active side, wherein the power device package is disposed in a product case ( fig 1 reference 20 ) and the non-active side of the semiconductor chip includes a heat sinkable

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surface positioned adjacent to and thermally connected to the product case with a single thermal interface ( fig 1 layer 28 of thermal compound ).

**FIG. 1**

Similarly Distefano fig 2 (semiconductor chip 40, product case 22, single thermal interface 28) discloses the same invention.



## REGARDING CLAIM 2

Both Toy and Distefano disclose a Flip-chip mounting device,

## REGARDING CLAIM 10

Toy discloses (column 4 lines 13-15 ) that interface layer 28 is a thermo compound and similarly Distefano ( column 5 lines 19-20) discloses that layer 54 is thermally conductive

## REGARDING CLAIM 11

Toy discloses (column 4 lines 31-37) a BGA package while Distefano inherently discloses a BGA package in fig 1 or fig 2.

7. Claims 3,5 are rejected under 35 U.S.C. 102(b) as being anticipated by Distefano (US patent 6,075,289)

## REGARDING CLAIM 3,5

Distefano discloses a flexible circuit substrate (layer 60 fig 2, column 5 lines 57-65) made of polyimide (polymeric film)

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7. Claim 6 is rejected under 35 U.S.C. 102(b) as being anticipated by Toy (US patent 5,956,576).

**REGARDING CLAIM 6**

Toy discloses the use of an underfill (fig 1 layer 26) that is an epoxy resin cured by exposure to UV radiation therefore it is a thermoset epoxy resin.

**Claim Rejections - 35 USC § 103**

8. The following is a quotation of 35 U.S.C. §103(a), which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 7,12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toy et al. (US patent 5,956,576) in view of further remark.

**REGARDING CLAIM 7**

Toy discloses all the invention except for the location of different passage for over molding and underfill. This feature, however, is considered obvious since it has been held that the provision for adjustability when needed, involves only routine skill in the art.

A person skilled in the art at the time the invention was made would have been capable of making provision for central and perimeter passages for over molding and underfill using the

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teachings by Johnson and his routine design skill and come up with the invention of claim 7 without any special teachings.

REGARDING CLAIM 12

Toy et al. disclose all the invention except going into detail about using about using a leadless QPF chip power package. This feature, however, is considered obvious since the leadless chip QFP has been known since the semiconductor start-using surface mounted device for example the device disclosed by Lo et al. (US patent 6,507,120)

A person skilled in the art at the time the invention was made would know how to put a lead less QPF device inside the enclosure invented by Toy without any special teachings for the purpose of provide protection for this device.

10. Claims 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toy et al. (US patent 5,956,576) in view of Casto (US patent 5,172,214)

REGARDING CLAIM 8.

Toy et al. disclose all the invention except for going into detail that his invention can be used on chip that has leadframe and gold ball bonds. This feature, however, is old and well known in the art as evidenced by the disclosure by Casto (US patent 5,172,214).

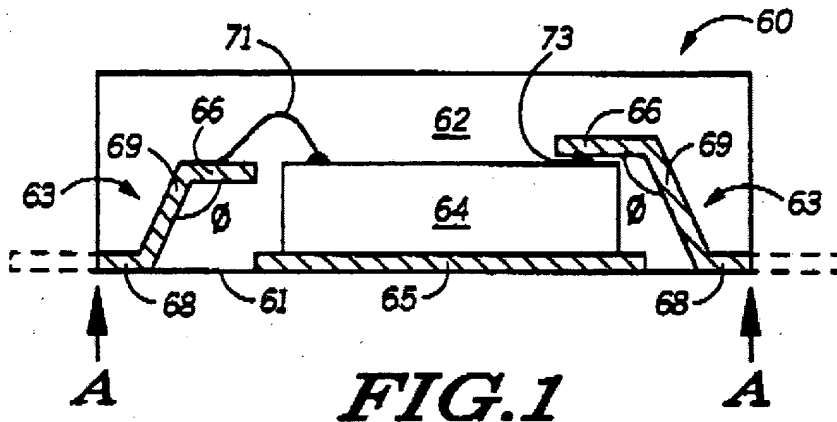
Noted that Casto disclose in fig 1a chip that can be mounted on a circuit board or a substrate with copper leadframe (Casto column 2 line 66) used wire bond and gold balls (column 4 line 47).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings by Toy and his ordinary design skill and come up with the



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invention of claim 8 since a person skilled in the art would have been motivated to expand the use of Toy for more profitability.



11. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Distefano (US patent 6,075,289) in further view remark.

#### REGARDING CLAIM 4

Distefano disclose all the invention except for except for use of a ring carrier; this feature, however ; is old and well known in the art as shown by the Disclosure by Gore et al. (US patent 6,105,226) in fig 3 of their invention. A person skilled in the art at the time the invention was made would have been able to use a ring carrier on a substrate of the device invented by Distefano and come up with the invention of claim 4 without any special teachings with the motivation of improving the semiconductor device.

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

### **Conclusion**

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lin et al. (US patent Application publication 2004/0178494) disclose a semiconductor package with heat sink.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thinh T Nguyen whose telephone number is 703-305-0421.

The examiner can normally be reached on 8:30 am - 5:00 pm Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID NELMS can be reached on (703) 308-4910. The fax phone numbers for the

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organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval [ PAIR ] system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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